THE IMPACT OF NON-PRICING STRATEGIES ON THE FINANCIAL INTERMEDIARY ROLE OF TURKISH BANKS

A Master's Thesis

by
MAHMUT KARA

Department of
Management
Bilkent University
Ankara
May 2010

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The Institute of Economics and Social Sciences
of
Bilkent University

by

MAHMUT KARA

In Partial Fulfilment of the Requirements for the Degree of
MASTER OF SCIENCE

in

DEPARTMENT OF
MANAGEMENT
BILKENT UNIVERSITY
ANKARA

May 2010

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Management.

Assoc. Prof. Dr. Süheyla Özyıldırım

Supervisor

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Management.

Prof. Dr. Hakan Berument

Examining Committee Member

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Management.

Assist. Prof. Dr. Başak Tanyeri

Examining Committee Member

Approval of the Institute of Economics and Social Sciences

Prof. Dr. Erdal Erel

Director

ABSTRACT

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Kara, Mahmut

M.S., Department of Management

Supervisors: Assoc. Prof. Süheyla Özyıldırım

May 2010

This thesis aims to explore the effects of the availability of network branches on the intermediation performance of deposit banks in Turkey. Banks' intermediation performance was measured by their ability to attract loans and deposits. The variations of non-pricing behavior among large scaled versus small scaled banks and public versus private banks were also analyzed. Panel generalized method of moment was used with quarterly panel data between the years 2003 and 2008. Empirical findings reveal that there exist a positive and significant relationship between all deposit banks' intermediation performance and their branch network decisions. Results also confirmed that by having larger branch networks especially for large scaled, small scaled and private deposit banks significantly increase their deposits ans loans during the sample period. However, we couldn't find any association between the financial intermediation performance and branch network size of the public banks. Overall, the findings suggest that branch network decisions play a

critical role for deposit banks' performance. Considering recent competition among banks in Turkey, we expect that branching strategies and other non-pricing strategies of the banks will matter more in the future.

Keywords: Banking, Competition, Non-Pricing Behavior, Branch Network, Deposits and Loans.

ÖZET

TÜRK BANKALARININ FİYAT DIŞI STRATEJİLERİNİN FİNANSAL ARACILIK FAALİYETLERİNE ETKİLERİ

Kara, Mahmut

Yüksek Lisans, İşletme Bölümü

Tez Yöneticisi: Doç. Dr. Süheyla Özyıldırım

Mayıs 2010

Bu tez, mevduat bankalarının şube ağlarının, finansal aracılık faaliyeti performanslarına etkilerinin ortaya çıkarılmasını amaçlamaktadır. Bankaların performansları, kredi verme ve mevduat toplama kabiliyetleri ile ölçülmüştür. Ayrıca, büyük ölçekli bankalarla küçük ölçekli bankaların ve kamu bankaları ile özel mevduat bankalarının fiyat dışı davranışlarındaki farklılıklar da analiz edilmiştir. 2003 ile 2008 yılları arasını kapsayan çeyrek dönem panel verileri ile panel GMM methodu kullanılmıştır. Ampirik sonuçlar, mevduat bankalarının finansal aracılık faaliyeti performanslarıyla şube ağı kararları arasında pozitif ve anlamlı bir ilişki olduğunu ortaya koymuştur. Ayrıca sonuçlar, çalıştığımız dönem için, büyük ölçekli, küçük ölçekli ve özel sermayeli mevduat bankaları için şube ağı genişledikçe toplanan mevduatın ve kredi arzının artacağını da doğrulamıştır. Ancak, ampirik sonuçlar, kamu bankalarının şube ağı büyüklükleri ile finansal aracılık faaliyeti performansları arasında istatistiksel açıdan anlamlı sonuçlar olmadığını göstermiştir. Sonuç olarak, şube ağı karar-

ları, mevduat bankaları açısından kritik bir rol oynamaktadır. Türkiyedeki bankalar arasında son yıllardaki rekabet göz önüne alındığında, bankaların şubeleşme ve diğer fiyat dışı stratejilerinin daha önemli hale geleceği beklenmektedir.

Anahtar Kelimeler: Bankacılık, Rekabet, Fiyat Dışı Davranışlar, Şube Ağı, Mevduatlar ve Krediler.

ACKNOWLEDGMENTS

I would like to thank my advisor Assoc. Prof. Dr. Süheyla Özyıldırım for her immense and continuous support from the beginning of this thesis studies till the end. Trying to express my feelings with a few sentence is so weak for her contribution to this study and also to me as an advisor. I should emphasize that the most important payoff during the master program in Bilkent University was working with her.

It was my pleasure to get advices and contributions from Prof. Dr. Hakan Berument for reading and giving invaluable contributions especially for the econometric parts of the thesis.

I would also like to thank Assist. Prof. Dr. Başak Tanyeri for reading and giving invaluable comments.

I like to convey thanks to TÜBİTAK for the financial support they provided for my graduate study.

Last but not least, I would like to thank my family. Words are insufficient to express my feelings for them.

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CHAPTER 1

INTRODUCTION

Banks are providing financial services to firms and consumers. Banks also have the intermediation function for holding and exchanging financial assets. They enable profitable investments by collecting deposits and lending loans. Recent studies show that institutional and financial structures of banks and their roles in the economy are important for economic growth and social welfare (King and Levine (1993), Levine (1995, 1997), Demirgüç-Kunt et al. (2004)). When banking system does not work well there is potential for financial instability (Borth, Caprio, Levine, 2004).

Using bank level data and applying Panzar and Rose (1987) methodology, Claessens and Laeven (2004) calculated H statistics for 50 countries including Turkey to identify their market structure. They found that H statistics varies generally between 0.60 and 0.80 which suggests that monopolistic competition was the best description of the degree of competition in a banking sector. In the monopolistically competitive markets, both the pricing and non-pricing behaviors stimulate differentiations among the banks. In a competitive market structure, banks, in general, try to differentiate themselves to obtain higher market share and increase their market power to earn more profits. Banks may distinguish themselves in many ways: It may be reputation, product differentiation and extensiveness and location of their branch

networks (Northcott, 2004).

Yayla (2005) showed that asset concentration ratio[1] in Turkish banking sector began to increase after 2000 suggests less competition after crisis, however, it stabilized around 0.6 which suggests monopolistic competition in the sector during the period 2003 to 2008. Turkish banking sector changed significantly in this period. More precisely, there have been privatization efforts for the public banks, mergers and acquisitions of both public and private banks, excessive foreign bank entries and also introduction of new rules and regulations to the sector. Thus, the competition in the market has been more aggressive than ever in recent years. More recently, Çelik and Ürünveren (2009) also showed that banking sector is monopolistically competitive in Turkey.

Competition in the banking sector, is constituted by pricing and non-pricing competitions while pricing component takes place in the loan and deposit rates. However, non-pricing competition among banks is generally measured by advertising strategies or branch size (see, for example, Stigler (1968), Scott (1978), Kim and Vale (2001)). The determination of the strategic branching policy has always been a popular subject for researchers. For example, Kim and Vale (2001) examined the effects of branch size on banks' extracting market power performance which was measured market share in terms of total loans in Norway. They found that there is a positive relationship between the market share of the bank for loans and its branch network, which is measured by number of branches, while there is no relationship between market size of the bank and its branch network. Calcagnini et al. (1999) examined the determinants of the banks' branching strategies in Italy and found that existing market structure influenced de novo branching.[2] Moreover, they

[1]Concentration is a measure which shows how much of the total output in an industry is produced by the largest firms in that industry. It is widely used as an indicator for determining market structure.

[2]De Novo Branch means a branch office of a bank which is originally established by the bank and does not become a branch office of the bank as a result of a merger transaction.

showed that profitable banks with larger number of workers per branch and large amount of loans relative to deposits had more de novo branches. Carlson and Mitchener (2005) analyzed the effects of branching policy of the banks on the competition and the survival of these banks when there was a probable crisis in the economy. They found that effects that branching had on competition was quantitatively more important than geographical diversification for the bank stability.

Turkish banking sector faced two major crises in 2000 and 2001. Before 2000-2001 crisis, banks in Turkey has mainly invested on government debt instruments instead of private loans. Even in 2002, the share of government debt instruments in their total assets was was around 42% for all banks in Turkish banking market. This ratio decreased to 28% in 2008. However, as it was mentioned before it changed significantly in the post-crises period. Banks in Turkey have not been financing government debts as much as in the pre-crises period instead, they concentrated on exercising core financial intermediation function, loan lending and deposit collecting, for private investors and consumer since 2003. The regulatory environment of Turkish banking industry had also changed. Banking Regulation and Supervision Agency of Turkey (BRSA) was established in June 1999 and began to operate in August 2000. Before this institution, the regulation and supervision of banking system had a fragmented structure. This new independent authority has developed legal and institutional framework to increase supervision and audit in the sector to make the sector more efficient and competitive.[3]

In Turkey, there is a strong link between financial sector and whole economy.[4] The banking sector comprises approximately 80% of the financial sector in Turkey (BRSA Report, 2009). According to the financial reports of the banks, total assets of Turkish banking sector increased about 75% between

[3]Source: http://www.bddk.org.tr/WebSitesi/english/About_Us/About_BRSA/5804BRSA-Eng.pdf

[4]See Kaminsky and Reinhart (1999), King and Levine (1993), and Caprio (1998).

the years 2001 and 2008. The share of total loans in total assets had increased from 25% to 52% within the same period. Deposits that have been the major sources of bank loanable funds kept their share in the total liabilities, i.e. between 65% and 70%. Since Turkish banking sector made good progress in this period, it is worth to analyze the impact of branching strategies to these developments.

The number of branches of Turkish banks increased by almost 27% from 6,908 in 2001 to 8,790 in 2008. In fact, between the years 2001 and 2005, number of branches of all deposit banks decreased about 10%. However, after 2005 it increased almost 30% till 2008. In addition to the increase in the number of branches, both total loans and deposits per branch also increased during this period. As stated in the site of TBA, total loans per branch were 4.1 Million USD and reached to 27.3 Million USD in period 2001-2008. Similarly, total deposits per branch increased from 11.7 Million USD in 2001 to 33.9 Million USD in 2008. Since 2005 foreign banks have entered heavily to the Turkish banking sector by acquiring small banks. They opened many branches relatively in a short period of time. The number of branches of foreign deposit banks rised sharply from 209 to 2,034 in 2003 to 2008 period. Pehlivan (2004) stated that marketing concept was an alien concept for Turkish banks. Foreign banks however, came with their marketing strategies and established their marketing departments. In a short time, Turkish banks became aware of this concept and developed their own marketing strategy.

In the post-crises period, financial intermediation performance of the Turkish banking sector has been an interesting research area to investigate. In this thesis, our main aim was to explain the effects of branch network size to the financial intermediation performance of the deposit banks. We used changes in loans to GDP and deposits per GDP as proxies for the financial intermediation performance measures of the banks. In the first model, we examined the effects of branch network strategies to the lending performance

of the banks. In this model, we hypothesized that there is a positive relationship between the branch network size of banks and their total loans per GDP. In the second model, we estimated the effects of branch network strategies to the of deposit collecting performance of the banks. Similarly, we hypothesized that there is a positive relationship between the branch network size of banks and their total deposits per GDP. Both models were conducted for large scaled versus small scaled banks and public versus private and large private banks in Turkey. Large scaled banks are the largest seven banks in terms of their asset size. Asset size of the largest bank in the small scaled bank sample has evidently too small asset size. In this way, we aimed to explore whether the impact of non-pricing behaviors of banks on the financial intermediary performances vary among different scaled and different ownership type of banks in Turkey.

Although there are several other non-pricing behaviors in Turkish banking sector, we only used the number of branches because of the limitation in available data set. The banks were limited with the deposit commercial banks since other type of banks such as investment and development banks have no competitive behavior. They have few branches and give directed credits which encourages investments without collecting deposits.

In Turkey, the banking sector is very dynamic in the sense that they adapt new product and create alternatives immediately. Especially in the credit card market, the differenciation efforts of banks confirmed excessive competition in this sector. They offer special credit cards that consist many benefits for their holders. For example, the cardholders are able to purchase goods with installments without bearing any additional cost. They also offer special discounts, gifts and assistance services via telephone. FlexiCard is one of the credit cards with differentiated specialties. It lets users to choose the interest rate, rewards plan, fee and even the design on the card itself. A client can pick a higher or lower interest rate and at the same time get a

more or less generous bonus plan, and can decide how much of their annual fee they want to pay with the bonus points they earn. Another non-pricing effort is internet banking which was started to be used in late 1990s. Banking operations become cheaper and faster for internet banking users. The banks even started to use 3G technology recently. They send videos related to daily market reports to their customers via this technology. In 2002, the president and CEO of Garanti Bank, Ergun Özen stated that "We [banks] invest in technology and human resources much better than our competition; this gives an edge in producing an unmatched level of services and product range for our customers."

In our estimations to relate the impact of network of branches on the total loans and deposits of the deposit banks during the period of 2003-2008. First, we found that there is a positive and significant association with the number of branches and total loans per GDP for all banks except public banks. We also observed positive impact of network branches on the total deposits per GDP for all banks. The empirical findings showed that by increasing the branch network, a bank may collect more deposits per GDP. We also found that banks are, in general, price elastic in the loans and deposits market. Only for the large private banks, savers would not care much about the prices of the deposits that they invest. It seems that they make their decisions according to the non-pricing attributes of the banks. For example, large scaled banks offer special type credit cards, different type of services such as tailor-made solutions via private banking, using 3G technology to send economic reports etc. Moreover, they may also trust to these banks more relative to small scaled banks.

The remaining part of this study was organized as follows: Chapter 2 summarized the banking literature about non-pricing strategies of the banks. Brief information about the Turkish banking sector was given in Chapter 3. The empirical model was introduced in Chapter 4. Data set and methodol-

ogy were explained in Chapter 5. The empirical results were summarized in Chapter 6 and the thesis was concluded in Chapter 7.

CHAPTER 2

LITERATURE REVIEW

The performance of a bank is significantly related with the pricing characteristics but it is not enough to explain completely the financial intermediation performance of the banks (Berger and Hannan, 1989). Banks' performances are comprised of both pricing and non-pricing attributes of the banks. Non-pricing behavior of a bank may take many forms. Scott (1978) examined non-pricing competition in banking and took advertising and branching of deposit banks as examples of non-pricing competition in imperfect markets. Pinho (2000) studied non-perfectly competitive behavior in Portuguese banking market. He found evidence that interest rate and entry deregulation were associated with an increase in both price and non-price competition in the deposit market. Nowadays, the banks are imposing more importance to the non-price characteristics such as branching strategies, special credit cards,[5] Automated Teller Machines (ATM) networks, internet banking services or personnel attributes.

In the literature, there are studies to describe the effects of the market structure of the banking sectors to the competition intensity among the banks. Frexias and Rochet (1997) showed that, the optimal choice of loan and deposit volumes for banks in the perfect competition is the point where

[5]In Turkey, Fish card, Miles & Smiles, Wings Card are some of examples for special credit cards that banks are using as non-pricing tools.

the marginal profits are equal to the marginal management costs. If the market is perfectly competitive, then the behavior of a bank does not affect the market equilibrium. However, the market in which banks operate is not a perfectly competitive market. As Bikker and Haaf (2000) showed for the developed countries, banking markets are generally characterized as monopolistic competition. For the developing countries; Yeyati and Micco (2003) and Gelos and Roldos (2002) found the same market conditions for banking sector. In this market structure, there is stiff competition between banks because the number of banks may increase rapidly whilst total market share is limited. Moreover, Panzar and Rosse (1987) introduced a measure called H statistics which is a measure of competitiveness. This measure is obtained as the sum of elasticities of gross revenue with respect to input prices.[6] If this statistics is negative, then it can be stated that this firm is operating in a monopoly. The statistics will be positive but smaller than one when the market is monopolistically competitive or it is equal to one when the market is perfectly competitive. Similarly, Claessens and Laeven (2004) calculated H statistics for banking sector in 50 countries including Turkey during the period of 1994-2001. They found that H statistics lies between 0.60 and 0.80 suggesting market conditions of banking in these countries as monopolistically competitive. De Bandt and Davis (2000) measured the competition for banking sectors in France, Germany and Italy by using interest income and total income as pricing attributes of banks. They presented evidence that banking

[6]H statistics was firstly initiated by Panzar and Rosse in 1987. They constructed a model

$$\log TR = \alpha + \sum_{i=1}^{n} \beta_i \log w_i + \sum_{j}^{k} \gamma_j \log CF_j + \text{error}$$

in which assumed n input and single output production where TR denotes total revenue, w_i is the i-th input factor and CF is other firm specific control k-factors. They suggested that H statistics which can be calculated as: H= $\sum_{i=1}^{n} \beta_i$ is the sum of input price elasticities. Thus it reflects the competitive structure of the market. Moreover, they proved that H statistics is negative for a neo-classical monopolist or collusive oligopolist, between 0 and 1 for a monopolistic competitor, and equal to unity for a competitive price-taking firm in long-run competitive equilibrium.

markets in these three countries are not perfectly competitive, rather they are monopolistically competitive. Humprey and Rodriguez (2003) examined Spanish banking market and showed that the market is imperfectly competitive. The case in Turkish banking sector is also the same as the international examples. Çelik and Ürünveren (2009) showed that, Turkish banking sector is a monopolistically competitive market. In the banking sector, competition is mainly composed of pricing and non-pricing competition as in most sector. However the competitive nature of banking industry compels banks to use non-pricing tools intensively to differentiate themselves to achieve higher market shares.

In banking literature, there are many studies which are examining for the price characteristics of the banks, namely the loan rates and deposit rates. Barros (1995, 1999) used the differences in the regional markets in Portugal as a strategic variable in the bank loan and deposit pricing. He found that there were higher levels of competition for deposit pricing than loan pricing in Portugal banking sector. Similarly, Corvesier and Gropp (2002) found that there was a high intensity of price competition for savings and time deposits than pricing of loans and sight deposits. There are studies that indicate stickiness of the prices in banking markets. For example, Hannah and Berger (1991) argued that banks quoted interest rates for deposits are sticky in the sense that they vary less than the market interest rates. They showed that stickiness increases with market concentration. Berger and Udell (1992) found that credit rates in US are also relatively sticky, in the sense that an increase of one percent in the T-bill rate only leads to an increase of 0.5% of credit rates. Since prices are, in general, sticky in the banking sector, consumers would be more sensitive to non-pricing efforts.

In banking literature, studies on the non-pricing competition among banks widely concentrated on the branching decisions and its effects to the banks. For example, Zardhoohi and Kolari (1994) examined the branch level effi-

ciency in Finland. They showed that branch level efficiency increased with the number of branches in a network. Moreover, they found that this effect leveled off if the network size was less or equal to five branches. In order to catch up optimum branch network size, they argued that the general trend should be the consolidation in the banking industry. Scott (1978) claimed that a firm increased its use of non-price competitive devices (branching and advertising) as its market power initially increased from a low level. However, its use of non-price rivalry would eventually decreased as its market power increased beyond some intermediate level as in US banking market. Kim and Vale (2001) argued that in oligopolistically-competitive markets such as in Norway, non price considerations may be the most important tool by which firms differentiated themselves and extracted market power. They used branching decisions of the banks as a strategic behavior parameter and showed that rival banks' reactions were affecting significantly the branching decision of the corresponding bank. They found that as the branch network of a bank increased total loans supplied increased. Additionally, if rival's branch network increased the amount of loan provided would decrease. Similarly, Valverde et al. (2005) studied the same model introduced by Kim and Vale (2001) both for loan market and deposit market in Spanish banking market. Rival behaviors in the loan and deposit market were also taken into consideration. They found that branching strategy was more important for deposit competition compared to loan competition in Spain. Cesari et al. (2002) constructed a monopolistic competition model for the European banking system. They found that competition has become intensified especially after deregulation. They argued that banks were choosing their branching strategies according to the degree of competition on interest rates.

Dick (2003) examined the effects of the passage of the Riegle-Neal Act which allowed for nationwide branching in US on various aspects of banking markets and found that the increase in concentration in larger geographic

areas covering several states increased competition in the lending market.

Kim et al. (2007) examined Spanish banking sector for both savings banks and private banks in order to measure the ideal branching strategy. They found that for both bank types, opening new branches is ideal strategy both for loan and deposit efficiency. Dereli et al. (2007) explored the branching strategy of one bank that operates in Turkey during the period 2005-2006. They presented evidence that this particular bank used an estimation of additional amount of potential deposit collected by this bank when she adds a branch to her network. They also found that the critical components to establish branch are the level of national output (GDP) and public investments, and the population of the relevant branch location

Hirtle (2007) found no systematic relationship between branch network size and overall institutional profitability in US during 2003:Q3. Moreover, she claimed that there is a weak relationship between branch network size and overall bank profitability since the banks optimized the size of branch network as part of an overall strategy both branch based and non-branch based activities. She concentrated on small business loans, deposits and branch network size as branch performance proxies and argued that previous studies ignored the most recent technological innovations, i.e. the advent of internet banking, the proliferation of automated teller machines and increasing numbers of call centers when they study the impact of branching. In this thesis, we were unable to incorporate recent product and technology developments in the Turkish banking sector due to unavailability of data. Although we studied the fixed effect estimation to accommodate these developments, the results are not validated econometrically to report in this thesis.

There were also several studies on the non-pricing behavior of the banks related to credit card market and ATM network (see for example, Rochet and Tirole(2002), Matutes and Padilla (1994), Dick (2007), Nash and Sinkley (1997)). In Turkey, Akın et al. (2008) analyzed the non-price competi-

tion for the credit card market and found that in order to acquire market power, banks bundle their cards with other banking services and differentiate themselves by providing a number of non-price benefits to their credit card customers. Moreover, they argued that general quality of bank services, distributing money points, travel miles and similar benefits, enabling consumers to pay shopping bills in installments and offering discounts to cardholders are important factors for card choice of bank cardholders. Damar (2006) investigated whether shared ATM networks yields positive benefits for banks by increasing their productive efficiency in Turkey. He argued that even though it is possible to realize positive effects to the banks, there are multiple factors that determine these benefits. Mainly, these factors are geographical distribution of shared ATM networks between urban and rural areas and level of competition between banks.

In this thesis, we estimated the branching decisions on the banks' financial intermediation performance which we used the proxy of change in the ratio of loans to gross domestic product and the ratio of deposit amounts to gross domestic product for the intermediation performance. Using these performance measurements, we constructed a model to study how branching affected banks performances during the period 2003:1-2008:12. We classified banks as large versus small scaled banks and public versus private and large scaled private banks to identify variations of branching effects among banks according to their ownership type or asset size.

CHAPTER 3

TURKISH BANKING SECTOR

In this chapter, there are three sections: In the first section, general overview of the Turkish banking sector since 1990s was presented. Financial crises in 2000 and 2001 and their impact on the banking sector were summarized in the second section. Lastly, banking restructuring program and branching policy of the Turkish banking sector were reviewed.

3.1 Overview of Turkish Banking Sector

3.1.1 General Structure

Since 1990s, Turkish economy experienced several banking crises due to moral hazard problems, huge public sector deficits, high real interest rates, extremely risk taking behavior of banks, high inflation and volatile economic growth (Ertuğrul and Selçuk, 2002; Kibritçioğlu, 2005). During the period 1990-2001, while the average growth rate of GDP was around three percent, the volatility (standard deviation) of the GDP growth rate was reaching six percent which can be considered very simple evidence of instability in the economy. The economy had been exposed to crisis in 1991, 1994 and 1998 (BRSA, 2009). The ratio of net debt of the public sector to GDP exceeded

60% within the same period. Moreover, overnight interest rates increased to 150% annually in 1994 and 2,300% in 2000.

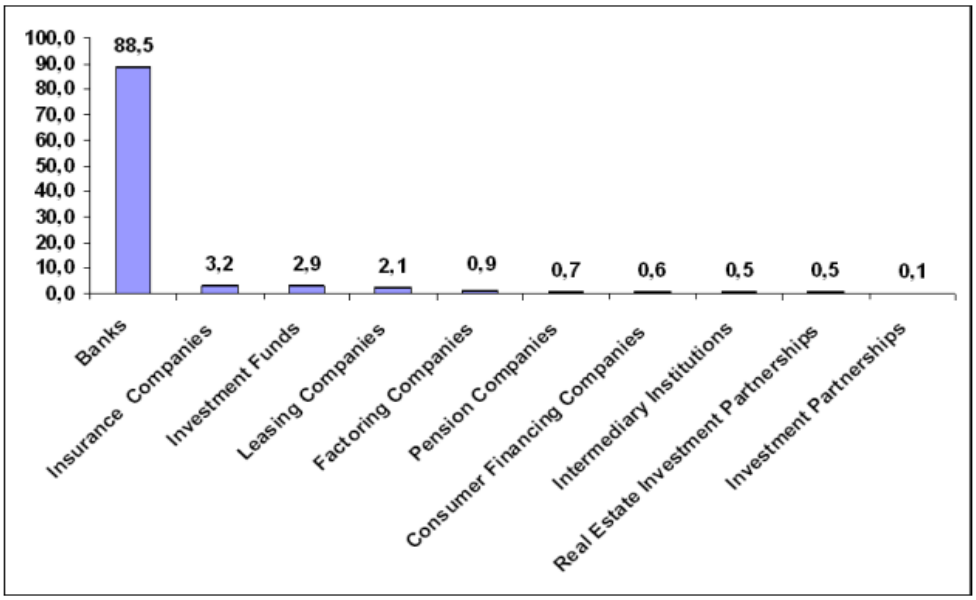

Figure 3.1: Financial Sector in Turkey as of 2008 (Source: CBRT)

Macroeconomic and political risks have been impinged on Turkish banking systems health. Nevertheless, the banking sector is still in development process and has further growth potential. According to the Banks Association of Turkey (TBA) (2009), the ratio of financial assets consisting of bank assets, bank shares and public and private borrowing instruments to GDP is 150% in Turkey as of 2007 whereas this ratio is 246% for other developing countries and 421% for the world. The main component of the Turkish financial sector has been the banking system. The share of Turkish baking sector in total assets of the Turkish financial sector reached 88.5% as of December 2008 (Figure 3.1). The remaining part of the financial sector, which is mostly owned or affiliated with the major commercial banks, consists of insurance companies, factoring companies, leasing companies, consumer financing companies, pension companies, intermediary institutions, investment funds, investment partnerships and real estate investment partnerships. Although banks constitute the major part of the financial sector in Turkey, the size of the banking sector is small as compared to developed countries even transition countries

in the Central and Eastern Europe: The ratio of the asset size to GDP increased to 77.1% as of 2008 from 62% as of 2000. The main reason that led the sector to be inefficient in terms of providing intermediation service can be summarized as volatile macroeconomic environment, small capitalization of the banks, weak risk and management applications, insufficient audit mechanism and modern legal framework, full deposit insurance applications and public banks which were dominating the banking sector (BRSA, 2009).

There were 56 commercial banks at the end of 1990. But only five of them had total assets of larger than 10 billion TL. These five banks were composed of 50% of the banking sector in 1990 and this ratio was kept its level even in 2000 (see Table 3.2, for CR5 in 2000). However, there was a notable increase in 2001 and 2002 due to the failure of some banks and consolidation of public banks in Turkey. There was 8 public deposit banks in 1990 while it decreased to 3 in 2003 while total number of banks also decreased from 67 to 50 during this period.

Since the number of banks decreased significantly after 2002, market share of the largest bank become relatively higher. More precisely concentration ratio for five largest banks did not change much and stabilized around 65% for assets and deposits. On the other hand, the concentration ratio for the branches started to decrease by 2005 suggesting more competition in terms of branches. In 2005 by the announcement of Turkey as a candidate country to European Union, significant foreign entries to the banking sector occurred. These banks entered the market by taking over the existing small private banks with good branch network. As seen in Table 3.1 foreign deposit banks' branches increased almost 10 times (from 209 to 2034) during 2003 to 2008. Their heavy branching strategies are aimed to have higher market power immediately in the sector.

According to HHI, CR3 and CR5 values, Turkish banking sector seems to be more like "monopolistically competitive". Another interesting and notable

market structure is the existence of dominating large scaled, private and public banks. As it will be seen in Table 5.1 and according to concentration ratios in Table 3.2, public banks are among the largest banks in Turkey.

The loans share in the total assets of the banking sector had decreased while the share of the securities increased sharply since 1990s till the twin financial crises in 2000 and 2001. The share of the securities in the total assets were around 10% in 1990 and reached to 41% in 2002. On the other hand, loans to asset ratio of banks decreased from 47% in 1990 to 23% in 2002 (Figure 3.2). As reported by BRSA (2009), "As a consequence of macroeconomic and political stability secured in 2002-2008 periods and appropriate policies for banking sector, total assets of the sector grew with an annual average of 23%. Owing to the fact that intermediation activities which are the basic function of the sector could be concentrated on, loans became the item displaying the highest increase throughout the period. In 2002-2008 periods, total loans grew with an annual average of 40%." As of 2008, the share of loans in the total assets of the banking sector reached to 50% while the securities ratio to the total assets decreased to 26% (Figure 3.2). As shown in Figure 3.2 these ratios are clearly indicating that the crowding out effect of the government decreased while the loans provided to real sector relatively increased within this period.

During the twin crises, since the public sector debt requirement were incredibly high; Treasury had to sell its debt instruments with a very low maturity and a high interest rate in order to finance public deficits.[7] In fact, managers of the banks made economically rational choices and provided their loanable funds to government as a riskless and very profitable investment instead of lending to real sector. Because the exchange rate regime was also convenient to take currency risks in 2000,[8] banks borrowed also foreign cur-

[7] An auction with a 28 days maturity and 144.23% interest rate was done in February 2001. Moreover, there were also auction announcements but did not happen due to no bids offered by the investors.

[8] Due to the exchange rate based stabilization program launched in 2000, Central Bank

Table 3.1: Number of Banks and Branches

	1990		2000		2003		2008	
	Number		Number		Number		Number	
	Banks	Branches	Banks	Branches	Banks	Branches	Banks	Branches
Deposit Bank	56	6,543	61	7,807	36	5,949	32	8,741
Public	8	2,975	4	2,834	3	1,971	3	2,416
Private	25	3455	28	3,783	18	3,594	11	4,290
SDIF	-	-	11	-	2	175	1	1
Foreign	23	113	18	117	13	209	17	2,034
Non-depository Banks	10	10	18	30	14	17	13	49
Public	3	3	3	11	3	4	3	23
Private	4	4	16	14	8	9	7	23
Foreign	3	3	3	3	3	3	3	3
Total	67	6,566	79	7,837	50	5,966	45	8,790

Source: TBA. SDIF stands for banks in the Savings Deposit Insurance Fund.

Table 3.2: Bank Concentrations, 2000-2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Concentration Ratios (CR)									
CR3 Asset	0.32	0.39	0.49	0.46	0.45	0.48	0.44	0.43	0.43
CR5 Asset	0.50	0.59	0.71	0.64	0.63	0.66	0.66	0.65	0.65
CR3 Deposit	0.38	0.38	0.48	0.45	0.46	0.48	0.45	0.45	0.44
CR5 Deposit	0.51	0.56	0.70	0.63	0.64	0.67	0.65	0.65	0.65
CR3 Branch	0.40	0.48	0.44	0.45	0.45	0.44	0.41	0.38	0.37
CR5 Branch	0.51	0.64	0.61	0.64	0.65	0.62	0.59	0.55	0.55
Herfindahl Hirschman Index (HHI)									
HHI Asset	643	836	883	1,058	1,058	1,077	1,050	1,027	1,034
HHI Deposit	763	879	987	1,073	1,150	1,128	1,094	1,080	1,089
HHI Branch	633	670	701	1,028	1,047	1,009	932	861	835
Number of Banks	78	61	54	50	48	47	46	46	45

Source: The Banks Association of Turkey. CR3 (CR5) is market share of three (five) largest banks in the sector. CR5> 0.80 indicates high concentration. HHI= $10000 * \sum_i^n s_i^2$ where n is total number of banks and s_i is market share of bank i. If HHI < 10000, market can be considered as competitive whereas $1000 \leq$ HHI < 1800, the market is mildly concentrated.

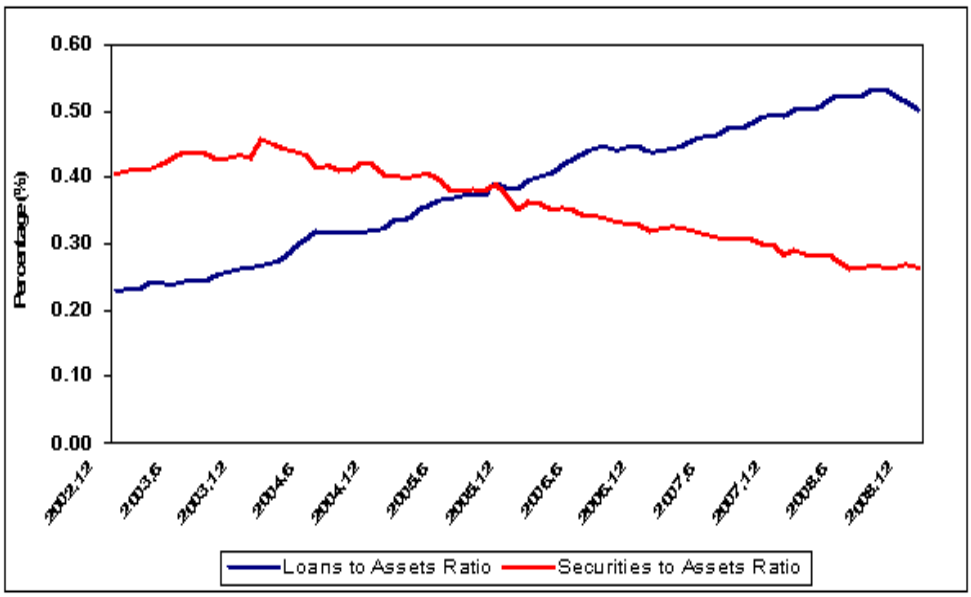

Figure 3.2: Loans to Assets and Securities to Assets Ratios

rencies relatively with lower rates and invested to domestic government bonds. At the beginning of 2000s, the net income of Turkish banks was heavily composed by Treasury activities. As seen in Figure 3.3, it was still above 60% of their net income as of 2002. It can be argued that the banking sector was not fulfilling its main intermediary role well before 2002. However, the banking sector has been always producing higher rates of return. Its profitability was consistently three to five times higher than the norms in most OECD countries (McKinsey Global Institute Report, Retail Banking, 2003).

3.1.2 Regulatory Environment

The 1985 Banking Law (Bank Act No. 3182) was the first major attempt to regulate banking sector in Turkey. According to this law, Treasury was the institution that was responsible for regulating the banking sector till 1999. While Treasury was the responsible institution to regulate the sector, it was also responsible to meet the day to day financing needs of the government of which are done through deposit banks generally. This duality was one of the main causes of politicizing the banking supervision and regulation

pre-announced the exchange rate path and guaranteed these rates.

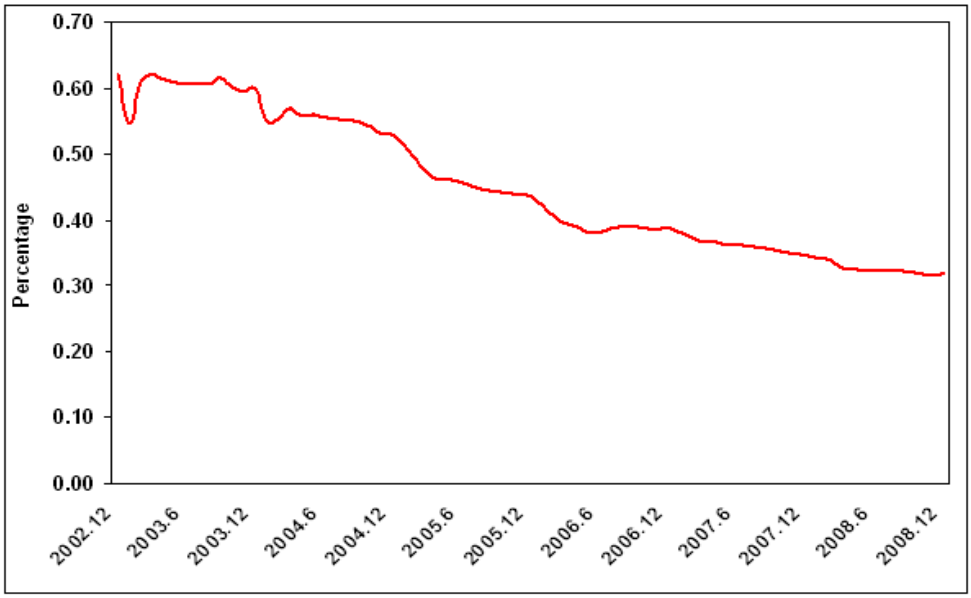

Figure 3.3: Ratio of Profits Generated Through Securities

activities in Turkey. In 1999, a new act was launched, namely Banks Act No. 4389. Banking sector aimed to synchronize with the international banking regulation standards. By this law, BRSA has been established which is an independent council in order to monitor and regulate the banking sector. However, this law also changed eight times till 2004. Lastly, a new Bank Act was launched, namely Bank Act No. 5411 in late 2005. According to international banking standards, this law can be considered as a modernist law.

Explicit deposit insurance was introduced in Turkey in 1983. Initially, the insurance fund offered a limited coverage for the depositors and funded by premiums paid by the commercial banks. Later, it turned to full deposit insurance scheme during the 1994 currency crisis and blanket guarantee during 2000-2001 twin crisis.[9] As emphasized in the literature extensively (see for example Demirgüç-Kunt and Detragiache (2002) and Demirgüç-Kunt and Kane (2002)), explicit insurance increases the risk attaching to the asset portfolios of commercial banks. Moreover, full deposit insurance promotes significant

[9]See Demirgüç-Kunt, Karacaovalı, and Laeven (2005) for details of insurance in Turkey since 1983.

moral hazard problems in the banking systems. As documented by Denizer et al. (2000) and Özyıldırım and Önder (2008), Turkish banks undertook excessive risks especially in the period with full government guarantee on deposits. Tanyeri (2010) stated that there was lack of transparency in the same period.

In July 2000, as part of the disinflation program,[10] government started to phase out the full deposit insurance, by lowering the ceiling to 100 billion TL.[11] In July 2003, the BRSA announced that it would adhere to the full deposit insurance, but that it would reduce the coverage to deposits that are below 50,000 billion TL by July 2004, which was executed as planned. This ceiling is broadly in line with the deposit guarantee in EU countries, whereby the level of deposit protection varies between 20,000 euro and 60,000 euro, however it is still high for Turkey, given that its average income per capita is about one-fifth of that in the EU. Moreover, ceiling covers over 90% of the accounts by the number of accounts, but only about 60% by the size of accounts.

3.1.3 Public Banks

Existence of dominating effect of public banks in the sector was one of the discrepancies for the efficiency in the banking sector. La Porta et al. (2000) found evidence that there is a negative relationship between the degree of government ownership of banks and overall economic growth and productivity growth. In Turkey, the number of public banks declined from 12 in 1980 to eight in 1990 and four in 1999. At the end of 1990s, bad policies of government

[10] An economic program documented in December 1999, which aimed to reduce inflation rate until the end of 2002.

[11] Licence of İmar Bankası was revoked in June 2003 and its management also transferred to Savings Deposit Insurance Fund (SDIF). It was seen that the bank made off-the-record transactions because there were differences between the actual total deposit and the deposit notified to public authorities. It is stated that this was a rare corruption example in the banking history of the world. For İmar Bank case, new resources was allocated since SDIF's resources could not afford its cost. Deposit owners were paid a total amount of 8.6 billion TL as end of 2008.

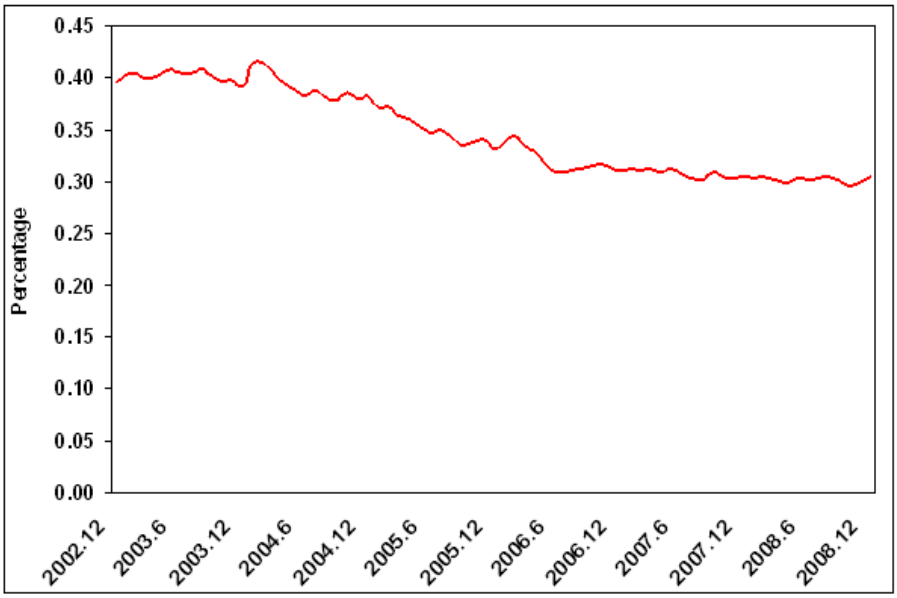

Figure 3.4: Percentage Share of Public Banks' Assets in Total Assets

with the excessive risk taking of banks led public banks to over-branched and over-staffed (Zaim, 1995). Ziraat Bankası, Halk Bankası, Vakıflar Bankası and Emlak Bankası[12] were the public banks which dominated the banking sector in 2000s, of which first three of them are still operating as public bank (see Table 3.1). As shown in Figure 3.4 their total assets share in the sector was 40% at the end of 2002 while it was still high in 2008 which was around 30%.

The dominant share of public banks has distorted the efficient resource allocation of banks in Turkey. As examined by Steinherr et al. (2004), the personnel regime in the public sector deteriorated the production efficiency of public banks in Turkey until 2000-2001.

[12]Emlak Bankası was transferred to Ziraat Bankası in 2001 by the decision of BRSA. In the same year, 96 branches which were transferred to Ziraat Bankası decided to be transferred to Halk Bankası.

3.2 2000 November-2001 February Crises and the Banking Sector

Before 2000, Turkish economy faced crises frequently because of unsustainable debt dynamics and some structural problems in the financial sector. As of December 1999, a new exchange rate based economic program had been launched to decrease inflation rate, to get sustainable economic growth rate and ensure the stability in the economy. The letter of intent was signed with IMF as of December 9, 2000. It proposed a three-year stand by arrangement. As highlighted by Akyüz and Boratav (2002), such programs generally lead to currency appreciations and relying on capital inflows attracts by arbitrage opportunities to finance growing external deficits. The program for Turkey sets forth a determined exchange regime for one 18 months period. It was programmed to be increased 20% of exchange rates for a year. This led banks to take risks of being in short of foreign exchanges more easily. On the other hand, inflation rate targeted to be decreased. There were performance criteria comprise of both primary surplus, privatization and both new and stock external of debt. This program was also aimed to make structural reforms on agriculture, pensions, fiscal transparency and tax administration. It had an exit strategy in order to avoid the negative effects of determined exchange rate regime (see Vegh 1992). Following 18 months, it designed to shift from determined exchange regime to progressively widening band around a determined path to achieve a smooth transition the floating rate regime effectively. At first, this program received both public's and IMF's support and confidence. Moreover, since Turkey was announced to be an official member to be considered for European Union enlargement net capital inflow increased notable. As capital inflow continued, money market liquidity increased, and overnight interest rates decreased significantly (Figure 3.5).

On the other hand, since the interest rates had been decreasing, banks

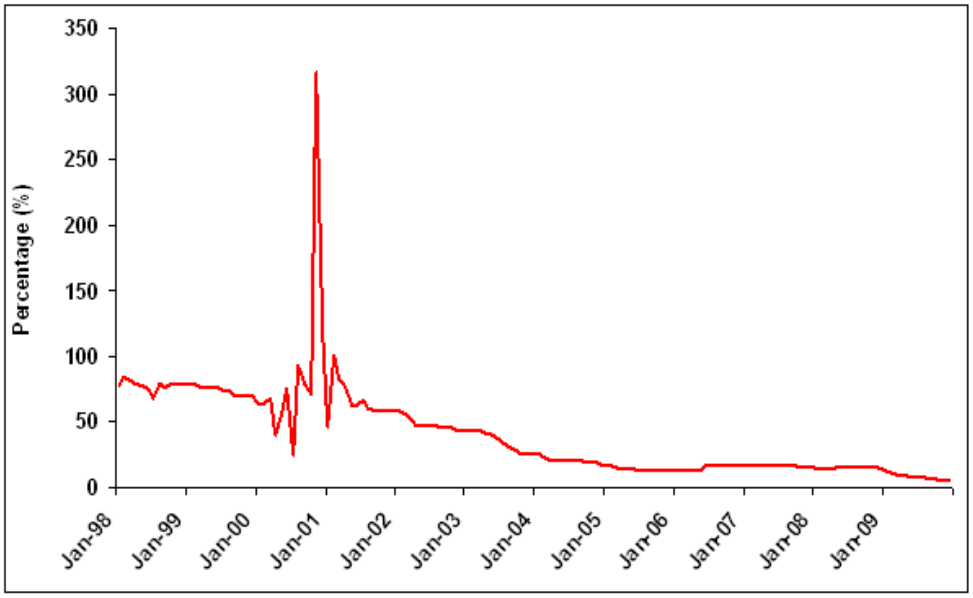

Figure 3.5: Average Overnight Interest Rate in Interbank Market

were positioning aggressively themselves by purchasing more government debts and engaging repo funding for short term financing needs. Central bank lending to the banks in the interbank market and also providing liquidity to the market by purchasing government securities amounted approximately 4.3 billion USD. However, the net domestic asset ceiling was exceeded and the net international reserve floor was reached. First, the loss of credibility of the monetary authorities concerned the investors on the viability of the program. Then, capital outflows started to increase. The capital outflows triggered massive demand to foreign currencies led these capital to exit. Thus, liquidity crisis occurred on November 2000. Since the program did not allow interfering to interest rate, the interest rates raised sharply, i.e. overnight interbank interest rates jumped to even 2,300% in 2000. Finally, IMF announced a 10 billion USD package in order to avoid any possible speculative attack.

This program could not be able to match its aims because there were some structural problems and fragilities on public finance and banking sector in that period. In particular, banks exploited the arbitrage opportunities of borrowing at low cost abroad and investing high-yielding government debt

instruments. In expectation of further decline of interest rates due to disinflation, banks increased their long term fixed-rate government debts. This deteriorated the financial position of the banks and raised their liquidity, interest rate and currency risks. Additionally there was also political instability. The government could not be able to fulfill some of the commitments set by the program. For example, according to the program,[13] 21 public enterprises were supposed to privatized. Furthermore, regulatory measures of the banking sector had been delayed.

Speculative attack to the currency and capital outflow in November 2000 were overcome by a very high interest rate and loss of foreign exchange reserves and IMF credit amounting 7.5 billion USD. However, just after three months later, a political dispute fired another financial crisis. This time it was a currency crisis. As of 21st of February, interbank overnight interest rate was 6,200%. Central Bank of Turkey's currency reserve decreased approximately 5.4 billion USD within a week. Since the Central Bank could not survive to this attack exchange rate regime changed to floating rate regime immediately.

Since banks faced two severe crises, their balance sheets were significantly deteriorated. Banks were obliged to be rehabilitated in order to have sound banking system in Turkey. The fragmented regulation and supervision played role in fragility of Turkish banks (Özatay and Sak, 2003). In fact, SDIF has been established in 1983 by Decree Law No. 70 of the Banking Law and the Central Bank of the Republic of Turkey was empowered with its administration and representation. With the amendment of Banks Act No. 4389, the government decided to set up an independent institute, BRSA, to empower and manage SDIF in rehabilating failing banks after the twin financial crises. There were 25 banks transferred to the SDIF. Most of them are consolidated under some banks which are also under the control of SDIF in

[13]Entire letter of intent is available at http://www.imf.org/external/np/loi/1999/120999.htm

order to manage easily. On the other hand, four of them were sold directly, other four of them went to bankruptcy while one of them was transferred to a public bank. Under new regulatory structure, SDIF has been done its functions in a quick manner. The collections from the resolution of the SDIF banks amounted to 18 billion USD as end of 2008, of which 90% was collected by the end of 2004.

3.3 Restructuring Program and Branching Strategies

Turkish banking sector faced major transformations after twin crises in 2001 and 2002. Since we examined the post-crises period, these major changes in banking sector would be provided more extensively. Hence, in this section, we, first, explained the "Banking Sector Restructuring Program[14]" and then described the branching strategies of Turkish deposit banks.

3.3.1 Banking Sector Restructuring Program

Following serious two crises experienced in 2000 and 2001, economic policies changed, and the implementation of the policies were sent to the IMF as a letter of intention on 31st July, 2001. This letter of intention expressed the continuation of the economic reform program. The main goal of the program was to decrease the inflation rate to reach a more stable economic environment and to enable a sustainable growth rate. In order to achieve these goals; the banking sector was restructured. In May 2001, "Banking Sector Restructuring Program" was initiated to restructure public banks, to transfer the banks to SDIF of which distorts the stability in banking sector as soon as possible, to support some private banks which were affected deeply

[14]See www.bddk.org.tr/WebSitesi/turkce/Raporlar/DigerRaporlar/15279C8914BD.pdf for the full version of this program.

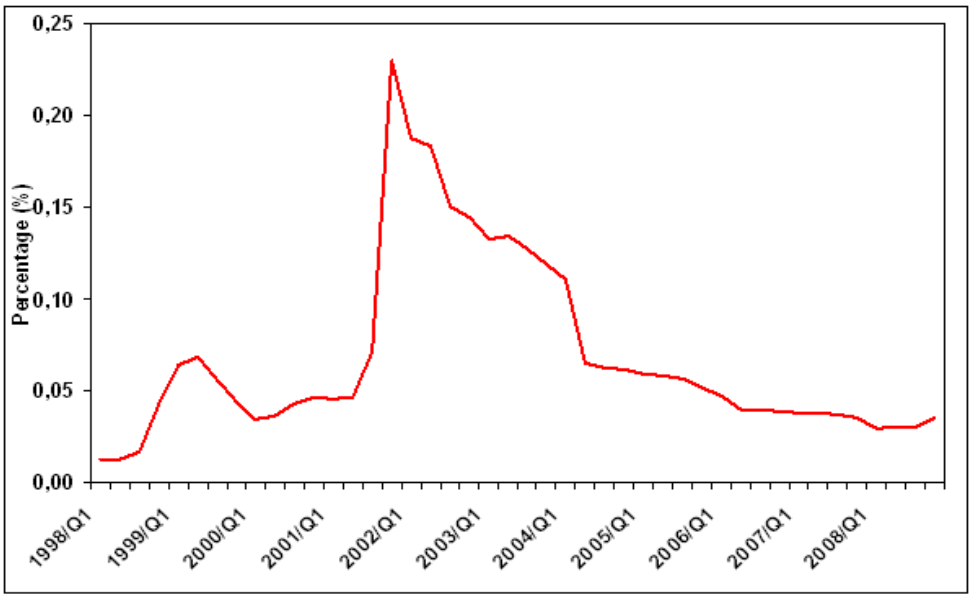

Figure 3.6: Ratio of Matured Receivables to Loans

from the crises in order to reach a healthier banking system and lastly, to strengthen the regulation and supervision framework in banking sector.

Jung (1986) emphasized that if real sector and financial sector are in a close relationship, a problem in one of these sector will spread to other sector as well. Similarly, the companies were not able to pay back the credits in Turkey because of the financial crises occurred in 2000 and 20001. More precisely, the ratio of matured receivables, the receivables that that have come due, to loans has increased sharply from around 5% in 2000 to 23% at the end of 2001 for deposit banks (Figure 3.6). In order to overcome this problem, two applications were introduced in 2003 and 2007 named as "İstanbul Approach" and "Anatolian Approach" respectively.[15]

As mentioned above, the government removed the fragmented structure in banking regulation and supervision, and established an independent body

[15]These applications were allowing companies to restructure their loan debts and obtaining new funding if necessary by the help of the Law 4743. One of them was called İstanbul Approach and was applied between 2002 and 2005. By this application, restructured loan amount was USD 5,960 million which was corresponding to 16% of total loan in the banking system as end of 2002. Anatolian Approach was implemented in 2007 likely İstanbul Approach. However, by this approach, insolvent small and medium sized enterprises were targeted to be regained to the real sector. Its idea was also restructuring debts these enterprises to financial sector as well.

which will be the sole authority in banking sector in 2000. Initially, The Undersecretariat of Treasury was responsible for issuing banking regulations and Central Bank of Turkey was responsible for off-site supervision and was managing SDIF. Banking Regulation and Supervision Agency was established in May 1999 and began to operate in August 2000, which has been the sole authority in Turkish banking sector since then. By this way, regulation process has been more transparent and the supervision system has been strengthened.

After 2000-2001 crises and especially restructuring of public banks, number of branches and staff had been reduced significantly (BDDK, 2009). Around 27% of the personnel retired as of September 2003. Moreover, almost 33% of the branches of public banks was closed. Around 50% of their personnel transferred to other public institutions. The program also suggested privatization of these banks. However, in the meantime, a special regulation was published on November 22nd of 2000 to change the status of the public banks as corporations. In Turkey, public banks are used to be operating under different legal structure than private banks. This regulation turned public banks to be operating as commercial banks in a more competitive market and subject to same Banking Act. Despite none of the public banks has been privatized since 2000, a merger occurred within these public banks. All assets and liabilities of Emlak Bank transferred to Ziraat Bankası on July 2001. After the merger, 96 branches of Emlak Bank transferred from Ziraat Bankası to Halk Bankası within the same year.

The duty losses of public banks[16] amounted 17.5 billion TL as of December 2001 was liquidated. Due to these losses including interest accruals, the Treasury compelled to issue Special Issue Government Bonds amounting 22.9

[16]The first time a duty loss occurred, it was recorded as a claim on the asset side of the state banks' balance sheet. Interest accruing on that stock was shown as interest income in the banks' profit and loss statement, even when no cash income was received from the Treasury. Treasury compensated for the flow of duty losses fully within the year through budgetary appropriations, and second, that it issued non-cash securities in exchange for the stock of accumulated duty losses. This operation increased the net stock of domestic debt. And this led Treasury to borrow more from the financial markets, and concluded crowding out effect for the loan lending mechanism in the banking sector.

billion TL. Moreover, capital support amounting of 3.5 billion USD were provided to strengthen the capital structure of the public banks.

As another effort to restructure commercial deposit banks, reporting standards changed to inflation accounting.[17] Thus the balance sheets of the banks have become more transparent with the help of inflation accounting.

By the "Banking Sector Restructuring Program," fiscal discipline and required legal framework were achieved. As stated by Rodrik (2009), "...Monetary policy is governed by an inflation targeting framework and an independent central bank. Fiscal policy has been generally restrained and the public debt-to-GDP ratio stable or declining. Banks have strong balance sheets, and regulation and supervision are much tighter than before." As mentioned before, banks in Turkey were mainly focused on the government debt instruments in the pre-crises period. However, in the post-crises period banks are not concerned with the profits gained by the government debt instruments as much as pre-crises period, they concentrated more on customer needs and main banking activities. These significant changes contributed to stable and high growth and decreasing real interest rate in Turkey. As it can be seen from Table 3.3, Turkish banking sector increased its intermediary role in the deposit and credit markets. According to the reports of TBA, total assets of the banking sector, in nominal values increased from 250 billion TL (179 billion USD) in 2003 to 733 billion TL (464 billion USD) in 2008. Total amount of loan provisions were also increased during the same period. Despite a slight decline during global financial crises, the amount of total loans reached from 49 billion TL (50 billion USD) to 367 billion TL (241 billion USD) as of 2008.

[17]Inflation accounting is a kind of accounting which shows the effects of price changes on the companys' assets and liabilities that were valued by the past costs. It was taken into account in 1975 for the first time and stood in international accounting standards which made by International Accounting Standards Committee. Whatever the reason of rising on the private and general price level, it was a non-related factor for the company. Rising of general price level which was not related to company would effect the financial statements of the company badly. The company might have paid more tax than it had to be because of higher inflation. In Turkey, inflation accounting application was started implementing just after 2003. And this application was terminated by BRSA for the banking sector at the beginning of 2005.

Total amount of deposits collected were also increased steadily between these periods. It increased approximately from 161 billion TL (115 billion USD) to 455 billion TL (298 billion USD). Loans to deposits ratio increased from 0.30 to 0.81 suggesting that banks have been using more of their deposits as credits. Overall, we can argue that intermediation performance of the banks increased remarkably after 2000-2001 financial crises in Turkey.

3.3.2 Non-Pricing Characteristics and Branching Strategies

Since 2000, banks operating in Turkey have faced with more competition (see also Table 3.2) and changed their pricing and non-pricing strategies on their main banking activities. In particular, increasing competition has compelled banks to offer similar prices for their loan sales and their deposit purchases. Their efforts to gain competitive edge shifted to the non-pricing efforts. Some of these efforts are brought new products to be introduced in the market. For example; credit cards which have different attributes relative to competitors' credit cards, internet banking activities with almost zero cost to customers, wider branch and ATM networks and concepts.[18] In several ways, banks have been concentrated more on their non-pricing decisions. In the banking practice, a good network of branches is considered as a major non-pricing competitive tool to reach more depositors and borrowers. However, cost of having wider branch network is considerably high. For example, Nath et al. (2001) showed that in US banking market, the average transaction cost at a full-service bank reduced from 1.07 USD to 0.27 USD at an

ATM, and fell to about a penny if the transaction was made on the web. Similar to many countries, ATM and internet banking tools have been used intensively as the means to collect deposits and provide loans in Turkish

[18]For example, some banks have shopping mall branch concept in which they have late service hours.

Table 3.3: Turkish Banking Sector, 2003-2008

	2003	2004	2005	2006	2007	2008
Total Assets (Million TL)	249,688	306,439	406,909	499,731	581,606	732,536
Total Loans (Million TL)	64,572	97,197	154,504	219,784	286,427	368,014
Total Deposits (Million TL)	160,812	197,394	251,490	307,647	356,865	454,599
Number of Credit Cards	19,863,167	26,681,128	29,978,243	32,433,333	37,335,179	43,394,025
Number of ATMs	12,857	13,544	14,823	16,511	18,800	21,970
Number of POS	662,429	912,118	1,140,957	1,282,658	1,453,877	1,632,639
Number of Branches	5,966	6,106	6,247	6,849	7,618	8,790
Number of Banks	50	48	47	46	46	45

Source: Interbank Card Center and The Banks Association of Turkey. POS stands for point of sale.

banking sector. Moreover, cellular phones have started to be used as newer tool of lending. Banks advertise extensively that borrowers can apply for loan by just entering their ID numbers and sending a message to the banks. They commit to start the process immediately even in five minutes.

Number of banks in the sector has stabilized around 50 banks since crisis in 2000-2001 in Turkey. On the other hand, number of branches of the whole banking sector increased from 5,966 in 2003 to 8,790 in 2008 (Table 3.7). The number of ATMs[19] increased almost 70% (12,857 to 21,970) during the period of 2003 to 2008 (see Table 3.3 and Figure 3.7). Number of branches per bank increased by 64% while it was registered as 88% for ATM between 2003 and 2008. The number of credit cards as one of the loan allocating bank instrument was 19.9 million in 2003 and reached to 43.4 million in 2008. The trend in branching and availability of several innovative products can be considered as the indications of increasing competition in the market and the efforts of banks to reach more customers after the post-crises period (Figure 3.7). The aggressive competition in the credit card market is also worth to mention in Turkish banking sector. Banks have been trying to differantiate themselves by launching different attributed credit cards. For example, Akbank made a strategic partnership with Boyner Holding and they launched a credit card named as Fish Card. They differantiate this card by its most important specification which is giving so many gifts to its holders. On the other hand, Yapı ve Kredi Bank is the first bank in Turkish banking sector which offered credit cards to its customers in 1988. As of 2009, this credit card has been the best card for 18 years in terms of sales turnover in credit card market in Turkey. As mentioned before, banks have been involved in the internet banking intensively since late 1990s. Number of customers that used internet banking at least once reached to 13 million as 2009. Overall, in a competitive banking sector in Turkey, we observe that it became a mandate to use non-pricing tools and follow technological advancements intensively.

[19] Number of ATMs are consists of banks which are subscribed to Interbank Card Center. And they are representing almost whole banking sector.

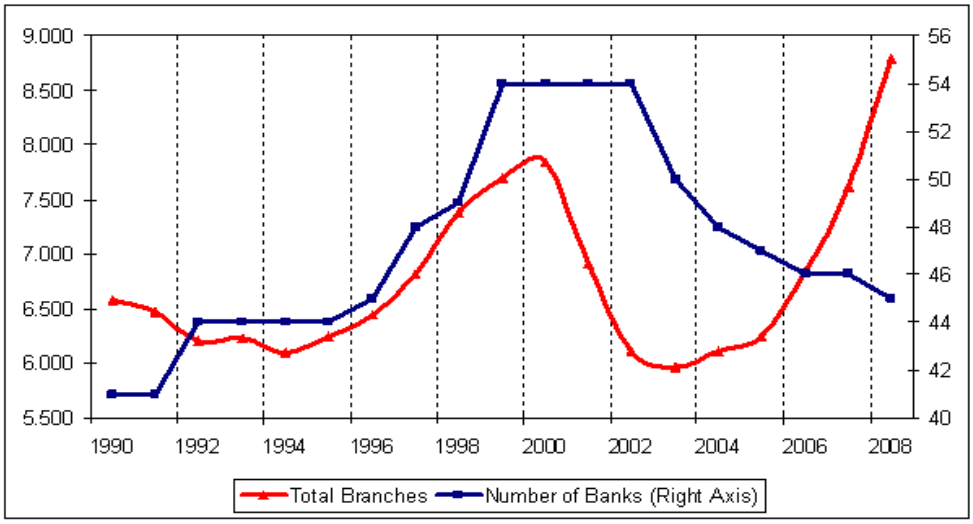

Figure 3.7: Number of Branches in Turkish Banking Sector (Source: TBA)

CHAPTER 4

THE MODEL

In this thesis, we estimated the effect of non-pricing behavior on the performance of the banking intermediation function. We used the loan amounts lent per GDP and the deposit amounts collected per GDP by banks as a proxy for the performance of the banking intermediation function. In order to explore the effects of non-pricing decisions to the performance of the banks' intermediary function we controlled for the impact of lending and deposit rates respectively. T-bill rate was also included in the model to control the impact of alternative uses of banking funds. We used number of branches as a non-price instrument. It was hypothesized that by increasing the number of branches a bank increases its loan per GDP. Similarly, by increasing the number of branches, a bank collects more deposits per GDP. Hence,

We specify our reduced form empirical models as;

$$log(L_{it}) = f[log(b_{it}), log(r^l_{it}), log(r^g_t)] \tag{4.1}$$

and,

$$log(D_{it}) = f[log(b_{it}), log(r^d_{it}), log(r^g_t)] \tag{4.2}$$

where i=1, 2, . . . , n denotes banks, and t denotes quarters.

The equilibrium amount of loan per GDP (L_{it}) is a function of number of the branch of the bank (b_{it}), average loan rate (r^l_{it}) and Treasury bill rate

(r_t^g) (see appendix A for full description of the variables). Our hypotheses for the first model (equation 4.1) as follows:

Hypothesis 1: The loans per GDP for bank for bank i at time t would have a positive relationship with the number of branches at time t. It is expected to have that $\partial L_{it}/\partial b_{it} > 0$.

Hypothesis 2: The loans per GDP for bank i at time t would have a negative relationship with its loan rate at time t. It is expected to have that $\partial L_{it}/\partial r_{it}^l < 0$.

Hypothesis 3: The loans per GDP for bank i at time t would have a negative relationship with Treasury bill rate at time t. It is expected to have that $\partial L_{it}/\partial r_t^g < 0$.

In the second model (equation 4.2), all the variables were the same except that price variables would be deposit rates. Accordingly, the amount of deposits collected per GDP was the independent variable. In this model specification, our hypotheses for this model are as follows:

Hypothesis 4: The deposits per GDP for bank i at time t would have a positive relationship with the number of bank branches. It is expected to have that $\partial D_{it}/\partial b_{it} > 0$.

Hypothesis 5: The deposits per GDP for bank i at time t would have a positive relationship with its deposit rate. It is expected to have that $\partial D_{it}/\partial r_{it}^d > 0$.

Hypothesis 6: The deposits per GDP for bank i at time t would have a negative relationship with the rate of the Treasury bill rate. It is expected to have that $\partial D_{it}/\partial r_t^g < 0$.

In addition to sample of all deposit banks, we tested our hypothesis for large scaled versus small scaled banks and public versus private banks. Since we estimated our regression by panel generalized method of moments, sufficient numbers[20] of instruments were used. These instruments were mainly

[20]The number of instruments is equal or greater than the number of regressors.

selected as the lagged values of the independent variable as in Arellona and Bond (1991) and the level values of the dependent variables in the regression equation. For all the estimation of the regression, we tested for the overidentifying restrictions of the instruments by Sargan test which were reported in the estimation results section.

CHAPTER 5

DATA AND METHODOLOGY

5.1 Data Set

In this thesis, we examined the performance of deposit banks between the periods of January 2003 and December 2008 with quarterly data. During this period, some of the operations such as mergers and/or acquisitions activities made the data to be unbalanced. For example, a merger realized between Koçbank and Yapı ve Kredi Bank at the end of 2006. Moreover, Pamukbank was transferred to SDIF in 2002 by BRSA. The bank continued its operations until 2004 and transferred to a public bank, Halk Bank.

Since we aim to measure branch network effects on banks' loan and deposit performance, we eliminated deposit banks that have very small network of branches. More precisely banks that had less than 10 branches on average for the period 2003 to 2008, were excluded from the data set[21]. In fact, these banks are mostly the foreign banks that had only representative branches and were operating in Ankara or İstanbul.

There were 32 commercial deposit banks by the end of 2008. Six of these banks are foreign banks as representative branches. They were excluded in our analyses. Moreover, four banks were also eliminated since they had less

[21]Similarly, Hirtle (2007) stated that, she excluded the banks with less than 10 branches since she was primarily interested in the performance of banks operating significant branch networks. The same argument is valid for this study also.

than 10 branches for the period 2003 to 2008. Hence, remaining 22 banks were examined. The banks included in the sample were: Akbank, Alternatif Bank, Anadolubank, Citibank, Denizbank, Eurobank Tekfen Bank, Finansbank, Fortis Bank, HSBC Bank, ING Bank, Koç Bank, Pamukbank, Şekerbank, Tekstil Bank, Turkish Bank, Türk Ekonomi Bankası, Türkiye Cumhuriyeti Ziraat Bankası, Türkiye Garanti Bankası, Türkiye Halk Bankası, Türkiye İş Bankası, Türkiye Vakıflar Bankası, Yapı ve Kredi Bankası (Table 5.1.). These 22 banks constitute 96% of the Turkish banking system as of December 2008.

Our main information source was The Banks Association of Turkey.[22] More precisely, the data related to total loans, total deposits, and number of branches were gathered from the statistical reports of The Banks Association of Turkey. Since the deposit interest rate and loan rates were not published explicitly, these variables were compiled from the footnotes of the financial tables by using data query system of The Banks Association of Turkey.

Treasury bill rates were taken from the Undersecretariat of Turkish Treasury. Treasury bill rate in the data set is the rate of which security has the maximum amount of transaction on relevant day. The type of security should have to be a discounted security according to the definition of the Undersecretariat of Turkish Treasury.

GDP variable was obtained from CBRT. All relevant data are converted to real values using consumer price index (base year of 2003) which is published by Turkish Statistical Institute. We also adjusted the data for seasonal effects by using X11 procedure in E-views. First, descriptive statistics for all deposit banks are represented in Table 5.2. During the sample period, on average, there were 334 branhes per bank. However, this number can be as high as 1,257 and as low as 12. As in all variables, we can observe variations among

[22]This institution was established in 1958 in order to preserve the rights and benefits of banks, to carry on studies for the growth of the banking sector, strengthening of competition power and so on.

Table 5.1: Some Balance Sheet Items of Banks (as of 2008, thousand TL)

	Total Assets	Total Loans	Total Deposits	Number of Branches	Ownership
Large Scaled Banks					
Türkiye Cumhuriyeti Ziraat Bankası A.Ş	104,412,496	30,836,194	83,883,435	1,257	Public
Türkiye İş Bankası A.Ş.	97,551,922	47,610,332	63,539,185	1,028	Private
Türkiye Garanti Bankası A.Ş.	88,940,860	49,907,407	52,715,281	721	Private
Akbank T.A.Ş.	85,655,014	44,374,104	52,181,947	867	Private
Yapı ve Kredi Bankası A.Ş.†	63,723,133	38,672,952	41,705,329	860	Private
Türkiye Vakıflar Bankası T.A.O.	52,193,493	30,502,299	37,120,277	523	Public
Türkiye Halk Bankası A.Ş.	51,095,895	25,836,298	40,271,114	619	Public
Small Scaled Banks					
Finansbank A.Ş.	26,572,978	17,878,045	15,939,067	457	Foreign
Denizbank A.Ş.	19,224,574	12,759,178	9,999,213	399	Foreign
ING Bank A.Ş.	16,503,074	11,044,083	9,997,729	360	Foreign
Türk Ekonomi Bankası A.Ş.	14,736,055	8,504,777	9,271,747	333	Private
HSBC Bank A.Ş.	14,695,934	9,723,783	9,183,424	331	Foreign
Fortis Bank A.Ş.	11,914,926	7,238,078	5,460,673	299	Foreign
Şekerbank T.A.Ş.	8,041,338	4,799,814	5,931,571	250	Private
Citibank A.Ş.	5,450,962	2,512,889	4,228,633	56	Foreign
Alternatif Bank A.Ş.	3,745,007	2,370,575	2,653,553	46	Private
Eurobank Tekfen A.Ş.	3,481,107	1,091,606	1,795,524	42	Foreign
Anadolubank A.Ş.	3,383,765	1,958,164	2,086,935	77	Private
Tekstil Bankası A.Ş.	2,953,108	1,606,119	1,434,470	60	Private
Turkland Bank A.Ş.	1,020,632	594,796	577,887	25	Foreign
Turkish Bank A.Ş.	823,201	201,734	413,340	26	Private

Source: www.tbb.org.tr. †Koçbank were not reported since it was merged with Yapı ve Kredi Bankası A.Ş. in 2006.

Table 5.2: Descriptive Statistics for All Sample Deposit Banks

	Mean	Median	Maximum	Minimum
Number of Branches	334	223	1,257	12
Total Deposits (Million TL)	3,140	1,249	20,460	39
Deposit Rate (%)	4.09	3.57	13.17	0.49
Treasury Bill Rate (%)	5.03	4.36	14.01	1.67
Total Loans (Million TL)	2,025	1,000	12,173	3
Loan Rate (%)	5.92	4.93	16.15	1.04

Note: All of the variables, except number of branches, are in real values.

banks in the sample.

Table 5.3 represents the summary statistics for large scaled and small scaled deposit banks used in our regressions respectively. Large scaled banks were determined according to their asset sizes. There are seven banks as large scaled bans: Türkiye Cumhuriyeti Ziraat Bankası, Türkiye Garanti Bankası, Türkiye Halk Bankası, Türkiye İş Bankası, Türkiye Vakıflar Bankası, Yapı ve Kredi Bankası, and Akbank (see Table 5.1). The largest of the small scaled bank's asset value (16.5 billion TL) was twice smaller that the smallest of the large scaled bank's asset value (31.8 billion TL) in nominal values as of end 2008. Comparing the summary statistics, one of the main differences between the large scaled and small scaled banks was the number of branch. Mean of the number of branch was 702 for large scaled banks while even maximum value of number of branch for small scaled bank was only 457. Similarly, it was observed that there were considerable differences between the total loan and total deposit amount variables. On the other hand, both loan rates of small scaled versus large scaled banks and deposit rates are very similar during the sample period. These descriptive statistics suggest that banks have few field for pricing competition while they have more opportunities to compete with their rivals via their non-pricing competition efforts.

Descriptive statistics for private and public banks are represented in Table 5.4 respectively. During the sample period, on average, the intermediation

Table 5.3: Descriptive Statistics for Large and Smalle Scaled Banks

	Mean	Median	Maximum	Minimum
Large Scaled Deposit Banks				
Number of Branches	702	627	1,257	329
Total Deposits (Million TL)	8,130	7,639	20,460	2,579
Deposit Rate (%)	3.49	3.06	13.17	0.74
Total Loans (Million TL)	4,710	3,784	12,173	328
Loan Rate (%)	6.16	4.99	14.96	1.82
Small Scaled Deposit Banks				
Number of Branches	139	140	457	12
Total Deposits (Million TL)	913	683	4,029	39
Deposit Rate (%)	4.37	3.77	12.81	0.49
Total Loans (Million TL)	828	484	4,385	3
Loan Rate (%)	5.82	4.90	16.15	1.04

Note: All of the interest rates and monetary values are in real values.

spread for public banks was higher as compared to private banks. Public banks asked higher loan rate while they offered lower deposit rate on average. On the other hand, lending rate for private banks are, on average, one percentage point lower than the average lending rate by public banks. Moreover the deposit rates by private banks were 0.6 percentage point higher than the rates by public banks. In terms of bank branches or non-pricing differences, it can be observed that the network of branches by public banks was almost three times larger than private banks. However, when we classified private banks as large private banks, the difference in non-pricing characteristics almost disappeared. Median branch size for large private banks was even higher as compared to public banks. Another notable difference was the lending and deposit rate for large private banks were smaller than the rates by an average private bank in Turkey.

5.2 Methodology

We used panel data estimation methods in our analysis. In panel data, adding the time period to the cross sectional dimension to the data were would help

Table 5.4: Descriptive Statistics for Private and Public Banks

	Mean	Median	Maximum	Minimum
Private Banks				
Number of Branches	260	185	1,028	12
Total Deposits (Million TL)	2,253	994	15,497	39
Deposit Rate (%)	4.18	3.68	12.81	0.49
Total Loans (Million TL)	1,840	723	12,173	3
Loan Rate (%)	5.78	4.88	16.15	1.04
Public Banks				
Number of Branches	756	595	1,257	356
Total Deposits (Million TL)	8,471	7,238	20,460	2,579
Deposit Rate (%)	3.58	3.05	13.17	0.74
Total Loans (Million TL)	3,140	2,595	7,696	328
Loan Rate (%)	6.75	5.64	14.96	2.32
Large Private Banks				
Number of Branches	662	640	1,028	329
Total Deposits (Million TL)	7,836	7,931	15,497	3,134
Deposit Rate (%)	3.42	3.13	8.73	0.82
Total Loans (Million TL)	6,059	6,299	12,173	1,558
Loan Rate (%)	5.66	4.74	13.26	1.82

Notes: All of the interest rates and monetary values are in real values.

to make better econometric estimations (Gujerati, 2004). The possibility of collinearity was lower and higher degrees of freedom which led to make better econometric inference from the data set. In the panel data analyses, it can be easier to answer some of the questions of which you could not answer with either time series or cross-sectional data. Furthermore, panel data are related to individuals over time, there was bound to be heterogeneity in the banking units in our analysis (Gujarati, 2004).

The basic form of panel data could be stated as

$$y_{it} = x_{it}^{'}\beta + z_{i}^{'}\alpha + \epsilon_{it} \tag{5.1}$$

In this specification, there were K regressor in $x_{it}^{\prime}$ and no constant term. On the other hand, the heterogeneity was stated as, $z_{i}^{\prime}$, which contains constant and as group variables. This model was specified as classical regression model. But if $z_{i}^{\prime}$ was observed for all individuals then the entire model could

be treated as an ordinary linear model and fit by least squares.

In general, using panel data estimation methods are summarized as pooled least square, fixed effect, random effect or panel generalized methods of moment methods and dynamic panel data models estimations. There are conditions need to be satisfied in order to make estimations by pooled least square method. If z_i' in equation were contained only a constant term then the ordinary least square would provide efficient and consistent estimates of the common intercept and the slope (β). This is called as pooled regression model. Baltagi (2005) stated that the appropriate technique depends upon the structure of the error term, ϵ_{it}, and the correlation between the components of the error term and the observed determinants of the dependent variable. As Pandey (2005) emphasized that pooled least square method was useful, if there was no bank specific or time specific effects were anticipated. However, Hausman test confirmed that data set consists of bank specific effects as expected. This unobserved bank specific effects would have an impact on our dependent variables; i.e, total loans and total deposits. Both fixed effects and random effects estimation techniques handle with unobservable factors. However, there are different assumptions for applying these methods. Fixed effect method is the method where the unobserved effect depends on the time and fixed factors for all banks. In the random effect model, the unobserved effect for each section is not fixed, but has random parameters. So random effect model assumes that each bank differs in its error terms. In our model specifications fixed effect model was found more appropriate method by using the Hausman test as emphasized by Wooldridge (2001), the time-varying errors must have zero means, constant covariances, and zero correlations in comparing random effect and fixed effect. This implies that the strict exogeneity assumption is crucial for consistency of the fixed effect estimator. However, it was not satisfied by our data set and the model specification. Hence, a generalized method of moments procedure can be more efficient than the fixed

effect estimator (see also Wooldridge, 2001). We used instrumental variables in order to overcome this problem in estimation by panel generalized method of moments (GMM). The instruments were the lagged values of dependent variables and level values and of independent variables.

In the following sections, we will summarize general specifications for fixed effect and random effect estimation and panel generalized method of moments estimation techniques respectively.

5.2.1 Fixed Effect Models

In fixed effect models, slope coefficients, which were shown as β do not change but the intercepts differ according to the cross sectional data. In our study it is assumed that it will change according to the banks. While the intercepts were assumed to be special for each bank, it might not change over time. So, these models were named as "fixed effect models".

The fixed effect models can be stated as,

$$y_{it} = x_{it}^{'}\beta + \alpha_i + \epsilon_{it} \tag{5.2}$$

where $\alpha_i = z_i^{'}\alpha$. In this fixed effect approach, α_i was considered as group-specific constant term. The term "fixed" was used to mention that the term of α_i does not vary over time. Moreover, unobserved variable, $z_i^{'}$ was correlated with $x_{it}^{'}$.

Fixed effect models may have some disadvantages. In this type of model specifications, there are too many dummy variables which might lead to insufficient number of degrees of freedom in order to have powerful statistical tests. In addition, too many variables in a model might also cause multicollinearity which increases the standard errors and it may lead to decrease in the statistical power of the test parameters in the model. Moreover, since there is the assumption of homoscedasticity and no autocorrelation in the residuals,

there could easily be bank-specific heteroskedasticity or autocorrelation over time which was observed in the trials of this estimation method.

5.2.2 Random Effect Models

In random effect models, the unobserved individual heterogeneity, $z_i^{'}$, was assumed to be uncorrelated with $x_{it}^{'}$. Hence, random effect models can be represented as

$$y_{it} = x_{it}^{'}\beta + E[z_i^{'}\alpha] + z_i^{'}\alpha - E[z_i^{'}\alpha] + \epsilon_{it} \tag{5.3}$$

$$= x_{it}^{'}\beta + \alpha + u_i + \epsilon_{it} \tag{5.4}$$

In the equation above, u_i was representing group specific random effect. This variable was similar to ϵ_{it}, but it was entered to the regression for all period. This individual random error was constant over time and specific to each bank: $E[u_i^2|x_i] = \sigma_i^2$. The random error, ϵ_{it}, was specific to particular observation. For u_i to be properly specified, it ought to be orthogonal to the individual effects. On the other hand, in this type of model specifications, it was assumed that both u_i and ϵ_{it} are distributed normally: $\epsilon_{it} \sim N(0, \sigma_\epsilon^2)$ and $u_i \sim N(0, \sigma_u^2)$. Moreover, there was no relation between the individual error terms, u_i, and with the panel error term, ϵ_{it}.

$$E[u_i\epsilon_{it}] = 0 \quad \text{and} \quad E[u_iu_j] = 0.$$

where i and j denote different banks in our model.

According to the results of Hausman tests reported in Table 5.5, we found that all the variables were exogenous and no endogenity problem was observed.

Table 5.5: Hausman Endogeneity Test

Variables	Probability
Branch	0.73
Loan Rate	0.56
Deposit Rate	0.65
T-Bill Rate	0.77

5.2.3 Panel Generalized Method of Moments

The general statement of our model specification is as follows:

$$y_{i,t} = x_{i,t}^{'}\beta + \alpha_i + \epsilon_{i,t} \tag{5.5}$$

where α_i was the bank specific constant term which does not change through time. In order to eliminate α_i, we took first differences of the variables:

$$y_{i,t} - y_{i,t-1} = [x_{i,t} - x_{i,t-1}]^{'}\beta + \epsilon_{i,t} - \epsilon_{i,t-1} \tag{5.6}$$

where $t = 2, 3, \ldots, T,\ i = 1, 2, \ldots, n$.

Since $\epsilon_{i,t} - \epsilon_{i,t-1}$ is independent of $x_{i,t}$ and $x_{i,t-1}$, it is allowed to choose $x_{i,t}$ or $x_{i,t} - x_{i,t-1}$ as instruments.

Thus, the model would be stated as

$$y_i^* = X_i^{'}\beta + u_i. \tag{5.7}$$

This equation is a general statement of the transformed panel generalized method of moment of model estimation. Moreover, let Z_i be the matrix of instruments used. Then, $E[Z_i u_i] = 0$ and $i = 1, 2, \ldots, N$.

More precisely, the dependent variable y_i^*, stands for the logarithm of the total loan amount per GDP for bank i or total deposits collected per GDP for bank i. $X_i^{'}$ represents the dependent variables used in the empirical model such as loan rates or deposit rates for banks, number of branches of a bank and the Treasury bill rates.

The regression estimation via generalized method of moment needs instrumental variables, transformation technique and a selection of weighting matrix. As Hayakawa stated (2009), it is common practice not to use all instruments since it is well known that using too many instruments deteriorates the finite sample behavior, especially, the bias of the GMM estimator. Since lagged values of the dependent variables are most widely used as instrument variables in empirical studies. As mentioned above, we used lagged values of the dependent variable and independent variables as instruments. All the instruments we used are level data, not their natural logarithms as used in original model equation. The instruments should be both relevant and valid: correlated with the endogenous regressors and orthogonal to the errors. Hence, we test the over-identifying restrictions in order to provide evidence of the instruments' validity. Using Sargan Test it seems that instruments were valid for both models (see Table 6.1 and Table 6.2).

Hayakawa (2009) proved that in the panel generalized method of moment estimation forward orthogonal was more efficient than first difference transformation technique which was suggested firstly by Arellano and Bover (1995). Although, both of these techniques could have been used, we used forward orthogonal deviation since it was found more efficient. The optimal weighting matrix can be chosen to minimize the mean squared error of the estimator. Since we selected orthogonal deviation in order to eliminate unobserved effect, we chose weighting matrix for GMM estimation as "White-period Arellano Bond n-step" which gave the minimum mean squared error. As a result, since the most efficient and consistent results were found by panel generalized method of moments and selecting relevant instruments, weighting matrix and transformation technique, we report their estimation results in the next chapter. However, we have also fixed effect estimations in Appendix C.

CHAPTER 6

EMPIRICAL RESULTS

In this chapter, we summarized the empirical results for loan and deposit models described in chapter 5. First, we presented results for all banks. Then, we presented the estimation results for small scaled versus large scaled deposit banks and public versus private deposit banks. Thus, we tried to understand whether banks with different size and different ownership type structure in Turkey have different non-pricing behavior during the period of 2003-2008.

6.1 Empirical Results For All Deposit Banks

We estimated both loan and deposit per GDP models using 22 banks in the sample. In the first columns of Table 6.1 and Table 6.2, it can be seen that coefficients of pricing and non pricing effects were confirmed the hypothesized relationships. More precisely, it was found that loan rate and loan amount had negative and significant relationship during the sample period. Increasing lending rates might lower the amount of bank loan provision per GDP since loans per GDP were found to be elastic to lending rates after post-crisis period in Turkey. Similarly, non-pricing factors were found to be significantly influencing the loan provisions per GDP for all deposit banks. There were significant and positive relationship between the number of branches of a bank

and the total amount of loans provided per GDP. Lastly, in the sample of all banks, it was found that there was no systematic relationship between the ratio of loans to GDP and Treasury bill rate. This relation may suggest that during the post crisis period, deposit banks in Turkey changed their asset management strategies to investing on loans instead of government bonds.

In the second model, we estimated the effect of number of bank branches on the amount of total deposit collected per GDP using whole sample. As seen in the first column of Table 6.2, the findings were confirmed the hypothesis 4 to 6 described in the chapter 5. Firstly, we found that number of branch was significantly associated with the amount of total deposits per GDP. This results confirmed finding by Dereli et al. (2007) in which Turkish banks locate branches according to potential for deposit growth. Our result suggested that banks might increase their sources of loanable fund by having larger network of branches. Overall, non-pricing factors were found to have association on both loans and deposits per GDP for all commercial deposit banks during the sample period. Moreover, total amount of deposit per GDP were found to be positively and significantly related to deposit rates. The pricing impact can also be observed in the coefficient of Treasury bill rate. We found that there was a negative and significant relationship between the Treasury bill rate and the amount of deposits collected per GDP. This result suggested that bank deposits and government bonds can be considered as substitutes for investors in Turkey. It seems that savers were found to invest less on deposit contracts if yields on government bonds increased.

6.2 Empirical Results for Large Versus Small Scaled Banks

As seen in Table 5.1, banks in Turkey can be classified as large and small scaled easily. In our sample, there are seven large scaled and 15 small scaled

banks. As summarized in Table 5.3, these banks with different asset group had different non pricing and pricing behaviors. By classifying these banks according to asset size, we aimed to understand how pricing and non-pricing variations were related to intermediation performances of these banks during the sample period. The empirical findings of the factors that were influencing loans per GDP for large scaled banks and small scaled banks were presented in the second and third columns of Table 6.1. It seems that lending rate and number of branches were positively and significantly related to the amount of loan provisions per GDP. Since increasing network of branches had positive impact on loan sales of small and large scaled banks, our results suggested that there was no behavioral difference in the branching strategies of these banks. The major difference among large and small scaled banks was how these banks' loans were related to the yield on government debt instruments during the sample period. If Treasury bill rate increased, the cost of capital would increase as well. This might create liquidity problem for the banks to match their loan demands. The results suggested that only the large banks, especially large private banks, can afford loan lendings in such a situation in the economy. The remaining four public large banks have different aims and objections while making loan lending decisions such as supporting farmers or small and medium sized enterprises. Hence, the impact of T-bill rates on the loan amounts by these banks were found to have no significant association (see column 5 of Table 6.1).

In column 2 and 3 of Table 6.2, the empirical findings that relate the amount of deposits per GDP and pricing and non-pricing behaviors of large and small scaled banks were presented. Our results confirm that increasing the number of available branches would have positive and significant impact on deposits collected by large and small scaled banks. We found no significant impact of increasing deposit rates on the total deposit per GDP of large scaled banks. By increasing deposit rates, large scaled banks were not able

to increase their sources of banks in Turkey. It seems that large scaled bank customers' main priority might not be monetary reward from their savings. For example, they may care more on the brand image, the trust and confidence that bank gives to the customer or other non-pricing services provided by these banks. However, we found that customers of the small scaled banks cared about the deposit rates offered by these banks. We can argue that deposits were price elastic for small scaled banks during the sample period. As it was hypothesized, there was a negative and statistically significant relationship between Treasury bill rate and the deposit amounts collected for large scaled banks. Because investors were willing to invest more on Treasury bills and government bonds when their return are higher rather than investing on deposits. This negative relation was also valid for small scaled banks but it had insignificant impact. Overall, empirical evidence showed that non-pricing characteristics of both small and large scaled banks played statistically significant role in the collection of deposits.

6.3 Empirical Results for Private Versus Public Banks

In this section, we presented results for public, private and large scaled private banks. The estimations made for these subsamples in order to measure the impacts of branching among the different ownership structures of the banks. We found significant differences between both pricing and non-pricing behaviors in both deposit and loan estimations among these samples.

The empirical results of loan estimations for public, private and large scaled private banks were presented in the columns of 4, 5 & 6 in Table 6.1. In all these banks, loan rates were negatively and significantly related to loan amount per GDP. However, it seems that the impact of branches on the amount of loans provided differs for public and private banks. More precisely,

number of branches did not have any significant impact on the loan amount per GDP for public banks while it had significantly positive effect for the private banks. As it was mentioned before, public banks have different aims and objections in Turkey. For example, they Ziraat Bankası established to give loans to farmers and Halk Bankası to small and medium sized enterprises in order to support them in accordance with government policies. They have already extensive branch network. Hence, increasing branch network had no significant change in their loan provisions. Moreover, we observed significant and positive association between bill rate and the loan amount per GDP for large private banks and public banks while this relation was not valid for private banks. It should be noted that most of the banks in the sample of private banks are also in the small scaled bank sample.

In columns 4 to 6 in Table 6.2, the results for deposit estimation of public, private and large scaled private banks were presented respectively. The results confirmed that there is a positive and statistically significant relationship between number of branches and total deposit per GDP in any type of banks. However, there was no significant relationship that was observed between deposit rate for both public and large scaled private banks. As it was mentioned in the previous section, customers of large scaled banks do not care much about the prices of their deposit contracts. These results also suggest that their main concern is trust and non-pricing benefits they may obtain. It is notable that the estimated results for deposit per GDP for public banks were similar to large scaled banks. It shows that large scaled banks' deposit rates are elastic due to their successful non-pricing efforts. Because investors would prefer to invest on government debt instruments as its interest rate increases compared to deposit rates, Lastly, Treasury bill rate had negative impact on the deposit amount per GDP for all bank types.

Table 6.1: Regression Results for Loans per GDP

	All Banks (1)	Large Scale Banks (2)	Small Scale Banks (3)	Public Banks (4)	Private Banks (5)	Large Scale Private Banks (6)
Log(Branch)	0.92***	1.06***	0.64***	-0.22	0.76***	1.18***
	(0.22)	(0.43)	(0.12)	(0.42)	(0.12)	(0.17)
Log(Loan Rate)	-7.01***	-14.61***	-8.27***	-17.99***	-7.52***	-13.16***
	(2.46)	(3.72)	(1.66)	(2.81)	(1.84)	(1.04)
Log(T-bill Rate)	-0.65	5.48***	-0.85	5.29*	-0.96	7.22***
	(1.76)	(2.15)	(1.72)	(2.80)	(1.82)	(1.22)
R-Square	0.31	0.22	0.40	0.76	0.43	0.69
Adj R-Square	0.31	0.21	0.39	0.74	0.43	0.69
Sargan Test Statistics	48.59***	98.68***	47.36***	43.73***	45.40***	27.73***
No. of Observations	434	138	296	67	370	74

* : significant at %10 level, ** : significant at %5 level, *** : significant at %1 level.

Table 6.2: Regression Results for Deposits per GDP

	All Banks (1)	Large Scale Banks (2)	Small Scale Banks (3)	Public Banks (4)	Private Banks (5)	Large Scale Private Banks (6)
Log(Branch)	0.70***	0.78***	0.76***	0.37**	0.62***	0.85***
	(0.08)	(0.15)	(0.06)	(0.16)	(0.06)	(0.09)
Log(Deposit Rate)	4.77***	1.79	3.88**	0.81	4.53***	3.16
	(1.37)	(1.08)	(1.88)	(1.52)	(1.34)	(2.53)
Log(T-bill Rate)	-3.17***	-3.00***	-1.05	-3.30***	-3.2***	-2.40**
	(1.08)	(0.85)	(1.52)	(1.05)	(1.22)	(1.15)
R-Square	0.26	0.09	0.28	0.87	0.31	0.46
Adj R-Square	0.26	0.08	0.27	0.78	0.31	0.44
Sargan Test Statistics	51.84***	57.54***	29.50***	54.78***	66.05***	33.2***
No. of Observations	432	137	295	66	369	74

* : significant at %10 level,** : significant at %5 level, ***: significant at %1 level.

CHAPTER 7

CONCLUSION

This thesis aims to explore the effects of non-pricing strategies, namely branch network effects, of the Turkish deposit banks to their financial intermediation function performance in the period 2003-2008. Turkish banking sector has gone through a restructuring program after the twin financial crises in 2000 and 2001. The effect of restructuring program on the banking sector began to be experienced in the beginning of 2003. In order to measure the impacts of the branching efforts of deposit banks to their intermediation performance, we started our sample data from 2003 and ended at the end of 2008. Because the global financial crises in 2007-2008 also distorted if we included the period 2009 on our analysis. Thus, the period 2003-2008 can be argued to be a suitable period to investigate the effects of the branch network effect to the intermediation function of the banks. After 2000-2001 crises, all banks including public banks are restructured, recapitalized and standardized their reporting internationally. The regulatory environment has also changed significantly.

Market structure of the Turkish banking sector was moderately concentrated. As a result, banks are the players who were affecting market by their both pricing and non-pricing strategies in the market. In general, non-pricing strategies of banks consist of advertising, branch network, ATM network, cus-

tomer relationship, internet banking, we only used branch network due to data unavailability.

Using unbalanced panel data, we did regressions by panel generalized method of moments in the estimations of total loan amount and total deposit amount for commercial banks in Turkey that had more than 10 branches on average. We also regressed some model for large scaled versus small scaled banks and public versus private banks in order to examine whether there are differences among these banks in terms of their branching strategies.

Our findings reveal that not only pricing strategies but also non-pricing strategies were played critical roles in the intermediation performance of the Turkish banks. As a result of having extensive network of branches banks would extract higher market power relative to their competitors in a competitive market environment.

In the estimation of the loan performances of the banks regressions, except public banks, we found statistically significant impact of branch network strategies. This result confirmed that public banks' visions and missions in Turkey is different than private banks. Similarly we also found that there was a positive and statistically significant relationship between number of branch and total deposit share in the GDP for all banks.

Because there was no statistically significant relationship between the total deposit share in the GDP and deposit rate for both large scaled and large scaled private banks samples, empirical results suggest that investors who prefer large scaled banks did not care much about the rate differences with the competitor banks.

As the law of demand suggests, average lending rate was found statistically and negatively associated with the loan share in the GDP for all samples. Moreover, there was a significant difference in the T-bill rate coefficients for the small scaled and large scaled banks. In the estimation of loan share for the large banks, including public banks and large scaled private bank sam-

ples, showed that there was positive and statistically significant relationship between the T-bill rate and loan shares in the GDP.

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APPENDIX A

DESCRIPTION OF VARIABLES

Log of Loans to GDP Ratio: This variable was used as a dependent variable. It was computed by taking natural logarithm of ratio of nominal values of total loans to nominal seasonally adjusted GDP. Total loan variable was obtained from the balance sheets of the banks that are reported by The Banks Association of Turkey while GDP was reported by the Central Bank of Turkey.

Log of Deposits to GDP Ratio: This variable was also used as a dependent variable. It was computed by taking natural logarithm of nominal values of total deposits to nominal seasonally adjusted GDP. Total deposit variable was obtained from the balance sheets of the banks (www.tbb.org.tr).

Log of Treasury Bill Rates: This variable is the arithmetic average of daily interest rates of the discounted Treasury bill rate which had the most transaction volume in İstanbul Stock Exchange. This variable is reported in İstanbul Stock Exchange (www.imkb.gov.tr) and Undersecretariat of Turkish Treasury (www.hazine.gov.tr). It was calculated by taking the natural logarithm of this arithmetic average of daily interest rates.

Log of Loan Rates: This variable is average interest rate of the all types of loans provided by banks. These rates were obtained from the database of

The Banks Association of Turkey. It was calculated by taking the natural logarithm of the loan rates.

Log of Deposit Rates: This variable is average interest rate of all types of offered by banks These rates were obtained from the database of The Banks Association of Turkey. It was calculated by taking the natural logarithm of the deposit rates.

APPENDIX B

ESTIMATION RESULTS BY USING OVERNIGHT RATES

In the original estimations, presented in the estimation, we used Treasury bill rate in order to encounter the alternative uses of funds. In general, banks may prefer to invest on interbank money market as alternative to loans or, banks may borrow from other banks instead of households. In Table B.1 and B.2 the estimation results for both loans and deposits of which interbank overnight rates were presented. We also estimated by using both Treasury bill rate and interbank overnight rates for loans and deposits equations. Those results were presented in Tables B.3 and B.4 respectively. Similar to our previous models, the relationship between branching and loans provisions and deposit collection was found to be positively related for all banks except public banks.

Table B.1: Regression Results for Loan Estimation

	All Banks	Large Scale Banks	Small Scale Banks	Public Banks	Private Banks	Large Scale Private Banks
Log(Branch)	0.91***	1.22***	0.65***	-0.24	0.75***	1.28***
	(0.22)	(0.39)	(0.13)	(1.11)	(0.13)	(0.19)
Log(Loan Rate)	-7.50***	-12.98***	-8.90***	-16.45***	-8.21***	-12.97***
	(2.14)	(2.84)	(1.48)	(3.99)	(1.67)	(1.50)
Log(Overnight Rate)	-0.31	5.99**	-0.30	5.04	-0.57	10.55***
	(0.89)	(2.63)	(2.25)	(3.08)	(2.39)	(0.71)
R-Square	0.32	0.18	0.40	0.74	0.43	0.74
Adj R-Square	0.31	0.17	0.39	0.73	0.43	0.73
J Statistics	6.60***	3.43***	6.87***	17.63***	6.04***	2.50***
No. of Observations	434	138	296	67	370	74

* : significant at %10 level,** : significant at %5 level, ***: significant at %1 level.

Table B.2: Regression Results for Deposit Estimation

	All Banks	Large Scale Banks	Small Scale Banks	Public Banks	Private Banks	Large Scale Private Banks
Log(Branch)	0.68***	0.73***	0.76***	0.14	0.61***	0.84***
	(0.09)	(0.18)	(0.06)	(0.29)	(0.06)	(0.07)
Log(Deposit Rate)	4.02***	0.27	3.91***	1.95***	4.10***	1.11
	(1.12)	(0.98)	(1.51)	(0.31)	(1.34)	(2.69)
Log(Overnight Rate)	-3.99***	-2.99*	-1.52	-6.09***	-4.22***	-1.43
	(1.34)	(1.58)	(1.83)	(0.98)	(1.44)	(1.46)
R-Square	0.26	0.07	0.27	0.89	0.31	0.42
Adj R-Square	0.26	0.06	0.27	0.84	0.30	0.40
J Statistics	10.26***	4.60***	7.31***	2.30***	63.65***	2.92***
No. of Observations	432	137	295	66	369	74

* : significant at %10 level,** : significant at %5 level, ***: significant at %1 level.

Table B.3: Regression Results for Loan Estimation

	All Banks	Large Scale Banks	Small Scale Banks	Public Banks	Private Banks	Large Scale Private Banks
Log(Branch)	0.92***	1.09***	0.64***	-0.40	0.77***	1.14***
	(0.23)	(0.45)	(0.12)	(1.05)	(0.12)	(0.13)
Log(Loan Rate)	-7.13***	-14.72***	-8.42***	-16.79***	-7.72***	-15.40***
	(2.46)	(3.69)	(1.66)	(3.59)	(1.86)	(1.92)
Log(Overnight Rate)	2.09	2.41	2.18	-12.95	2.80*	15.27***
	(2.08)	(3.87)	(1.95)	(3.80)	(1.68)	(2.92)
Log(T-Bill Rate)	-1.93	3.97	-2.19	12.96***	-2.67	-2.02
	(2.11)	(3.36)	(0.29)	(3.66)	(1.93)	(2.87)
R-Square	0.31	0.22	0.40	0.77	0.44	0.74
Adj R-Square	0.31	0.20	0.39	0.74	0.43	0.73
J Statistics	6.78***	3.59***	7.05***	15.63***	6.05***	15.24***
No. of Observations	434	138	296	67	370	74

* : significant at %10 level,** : significant at %5 level, ***: significant at %1 level.

Table B.4: Regression Results for Deposit Estimation

	All Banks	Large Scale Banks	Small Scale Banks	Public Banks	Private Banks	Large Scale Private Banks
Log(Branch)	0.69***	0.76***	0.75***	0.14	0.62***	0.83***
	(0.08)	(0.17)	(0.06)	(0.11)	(0.06)	(0.08)
Log(Deposit Rate)	5.05***	1.91	4.01**	1.92	5.07***	-4.00
	(1.36)	(1.06)	(1.85)	(2.07)	(1.36)	(1.78)
Log(Overnight Rate)	-1.75***	-0.68	-0.94	-4.90***	-2.14	-0.93
	(1.63)	(1.88)	(2.45)	(1.79)	(1.92)	(1.90)
Log(T-Bill Rate)	-2.25	-2.69***	-0.51	-0.32***	-2.15	-1.43
	(1.38)	(0.64)	(2.15)	(1.55)	(1.73)	(1.46)
R-Square	0.27	0.10	0.28	0.84	0.31	0.45
Adj R-Square	0.26	0.08	0.27	0.82	0.31	0.43
J Statistics	10.49***	4.55***	7.62***	2.46***	65.61***	24.20***
No. of Observations	432	137	295	66	369	74

* : significant at %10 level,** : significant at %5 level, ***: significant at %1 level.